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CHINA. No. X.

SCENE IN A CHINESE DRAMA.

DOMESTIC MANNERS OF THE CHINESE, AS EXHIBITED CHIEFLY IN THEIR DRAMATIC WRITINGS.

In the bulky literature of the Chinese the drama fills a space of some importance; and although it does not appear that they can boast of any great national dramatists, to whose names they may refer with pride, yet it cannot be said that the number of their dramatic compositions is inconsiderable. They possess a collection of plays in 199 volumes, from which have been selected 100 pieces, comprising, it is supposed, the flower of the whole. Out of this selection, which is styled the *Yuen-jin-pe-tchong*, a few favourite productions have been taken, and translated into European tongues,—some into French and some into English, while a few others have been analyzed and shortly described. As the restrictions which the Chinese have imposed upon the intercourse of "barbarians" with the Celestial Empire, prevent us from becoming acquainted with their domestic life in the ordinary manner, the study of their drama has been deemed an object of importance, as offering another mode of acquiring the desired knowledge. Sir George Staunton, indeed, has expressed the opinion, that their dramatic works are less calculated, on the whole, than their novels, to reward the labour of the translator.

Too local and national to please much as mere compositions, (says that writer,) and their minute beauties of style and language necessarily, in great measure, lost in the translation, the remaining sources of interest are but slender; the dramatic dialogue drily rendered, and unaided by the talents of the actor, can convey, generally speaking, no more than a very imperfect outline of that interesting picture of life and manners, which in their novels and romances is filled up in its minutest details.

Others, however, have thought that the drama of the Chinese will be found, on further examination, to be one of the most interesting portions of their general literature, and that it will afford us a greater insight into the habits, manners, and sentiments which prevail in their domestic life than any other species of composition. An important part of a Chinese drama consists of the songs which are scattered throughout it; it is difficult to render their meaning in another language, and thus they have been often omitted in our translations. Sir George Staunton says, that whatever is refined or elaborate in the language of the Chinese drama, seems to belong almost exclusively to these songs, or as they might more properly be termed, marked and emphatic passages intended to be sung; they have been described by Bishop Hurd, in his discourse on poetical imitation, as affording a rather remarkable instance of "coincidence between the Chinese and the Grecian models," and as somewhat resembling in character

the ancient chorus. As a specimen of these effusions, the following stanza, supposed, in one of their dramas, to be sung by the khan of the Tartars, may be taken.

The autumnal gale blows wildly through the grass, amidst our woollen tents,
And the moon of night, shining on the rude huts, hears the lament of the mournful pipe;
The countless hosts, with their bended bows, obey me as their leader;
Our tribes are the distinguished friends of the family of Han.

The obscurity which often runs through these bits of irregular verse is accounted for by Mr. Davis, who tells us that, according to the Chinese themselves, the gratification of the ear is the main object, and that sense appears sometimes to be neglected for the sake of a pleasing sound. The portion of their plays which is merely spoken, is in the language of common conversation, and is in most cases perfectly intelligible.

Stage-players are not held in great respect by the Chinese. Females are not prohibited from acting on the stage by anything in the code of laws, but it is provided that "all strolling players, who shall be guilty of purchasing the sons or daughters of *free* persons, in order to educate them as actors or actresses, or who shall be guilty of marrying, or adopting as children, such free persons, shall, in each case, be punished with a hundred blows of the bamboo." The same punishment is extended to the seller of free persons, and to females, born of free parents, intermarrying with strolling players. It is said that in Pekin alone there are several hundred companies of comedians, when the court is there; and that at other times they travel about from one city to another. A company generally consists of eight or ten persons, who are literally the servants, or slaves, of the master or manager. They travel in a covered barge on canals or rivers, near to which most great cities in China are situated; these barges are their habitations, and in these they are instructed in their parts by the master. When called on to perform before a party, a list of the plays which they are prepared to represent is put into the hands of the master of the feast, who consults his guests as to the choice to be made; this point being settled, the *dramatis personæ* are read over, and if it should happen that a name occurs therein corresponding with the name of any of the guests, another piece is immediately chosen, in order that no offensive act or allusion in the play may be coupled with the name of the auditor. Mr. Davis observes, that perhaps this restriction exists only on paper, and is not followed up in practice, just as the statute which prohibits musicians and stage-players from representing in any of their performances, "emperors, empresses, famous princes, ministers, and generals of former ages," is perpetually infringed; such representations being, in fact, the favourite and most usual subjects of theatrical exhibition. There is indeed a saving clause in the prohibition, which says, that "this law is not intended to prohibit the exhibition upon the stage of fictitious characters, of just and upright men, of chaste wives, and pious and obedient children; all which may tend to dispose the minds of the spectators to the practice of virtue."

When the common people wish for a theatrical entertainment, they subscribe among themselves a sum sufficient to cover the moderate expense of erecting the temporary theatre and paying the actors. According to De Guignes the temples, or pagodas, are sometimes used for theatres; and this would not be surprising, as they are known to be the common places of resort for gamblers, and the lodging-houses of foreign ambassadors and officers travelling on the public service. Mr. Davis observes, that in this respect the Chinese would not be singular; our old *mysteries* and *moralities* were frequently played in churches. Taverns in China have a large room set apart for entertaining guests with theatrical exhibitions, just as, in England, companies of players had occasional stages erected in the yards of the principal inns, in Queen Elizabeth's time. By these arrangements, the want of public buildings in the Chinese cities, such as in European cities are appropriated to theatrical exhibitions, would be sufficiently compensated for; but the Chinese have a further resource in their temporary theatres. A company of players will, at any time, construct a theatre in two hours: a roof of mats is supported on a few posts of bamboo; a platform of boards is raised six or seven feet above the ground; three sides of it are covered with curtains of painted cotton, while the fourth is left open to the audience.

When Lord Macartney's embassy was staying at Tien-sing, in the journey up the river Peiho, towards the capital, a temporary theatre was erected opposite to his Excellency's yacht. The outside was adorned with a variety of brilliant and lively colours, "by the proper distribution of which, and sometimes by their contrast, it is the particular object of an art among the Chinese to produce a gay and pleasing effect." The inside of the theatre was equally well decorated; and the company of actors successively exhibited, during the whole day, several different pantomimes and historical dramas. The performers were habited in the ancient dresses of the Chinese at the period when the personages represented were supposed to have lived.

One of the dramas (says Sir George Staunton) particularly attracted the attention of those who recollected scenes somewhat similiar upon the English stage. The piece represented an emperor of China and his empress, living in supreme felicity, when, on a sudden, his subjects revolt; a civil war ensues, battles are fought, and at last the arch-rebel, who was a general of cavalry, overcomes his sovereign, kills him with his own hand, and routs the imperial army. The captive empress then appears upon the stage in all the agonies of despair, naturally resulting from the loss of her husband and of her dignity, as well as the apprehension for that of her honour. Whilst she is tearing her hair, and rending the skies with her complaints, the conqueror enters, approaches her with respect, addresses her in a gentle tone, soothes her sorrows with his compassion, talks of love and adoration, and, like Richard the Third with Lady Anne, in Shakspeare, prevails, in less than an hour, on the Chinese princess to dry up her tears, to forget her deceased consort, and yield to a consoling wooer. The piece concludes with the nuptials and a grand procession.

Our engraving represents one of the principal scenes in this drama.

The subjects of the pieces exhibited are, for the most part, historical, and relate generally to the transactions of remote periods; in such cases the dresses are conformable to the ancient costume of China. There are others, however, that represent the Tartar conquest, but none built on historical events subsequent to that period. The ancient drama is preferred by the critics. They have also comic pieces, in which there is always a buffoon, whose grimaces and low jests, like those of buffoons elsewhere, obtain from the audience the greatest share of applause. The dialogue in all these dramas, whether serious or comic, is conducted in a kind of monotonous recitative, sometimes, however, rising or sinking a few tones, which are meant to be expressive of passionate or querulous cadences. The speaker is interrupted at intervals by shrill harsh music, generally that of wind-instruments, and the pauses are

invariably filled up with a loud crash, aided by the sonorous and deafening gong, and sometimes by the kettle-drum. An air or song generally follows. Joy, grief, rage, despair, are all attempted to be expressed in song on the Chinese stage.

The unity of action is so far preserved, that they have no actual change of scene, but change of place must frequently be supposed. To assist the imagination in this respect, their devices are whimsical enough. If it be necessary to send a general on a distant expedition, he mounts a stick, takes two or three turns round the stage, brandishes a little whip, and sings a song; when this is ended, he stops short, and recommences his recitative, the journey being supposed to be performed.

The want of scenery, (says Sir J. Barrow,) is sometimes supplied by a very unclassical figure, which, just the reverse of the *prosopopœia*, or personifications of grammarians, considers persons to represent things. If, for instance, a walled city is to be stormed, a parcel of soldiers piling themselves on a heap across the stage, are supposed to represent the wall over which the storming party is to scramble. This puts one in mind of the shifts of Nick Bottom: "Some man or other must present wall," and "let him have some plaster, or some loam, or some rough-cast about him, to signify wall."

The audience are never left in doubt as to the character which is produced before them; for the *dramatis personæ* are introduced in appropriate speeches to the acquaintance of the spectators, each performer on his first entry stating who and what he is, what remarkable deeds he has performed, and what are his present views and intentions. Thus, in the opening scene of *An Heir in his Old Age*, which has been translated by Mr. Davis, the *dramatis personæ* being a family of the middle class in China, consisting of an old man, his wife, his second wife, his daughter, his son-in-law, and his nephew; in the opening scene, the old man himself, Lew-Tsung-sheu, comes forward and speaks thus:—

I am a man of Tung-ping-foo; my surname is Lew, my name Tsung-sheu. I am sixty years of age, and Le-she, my wife, fifty-eight. My daughter Yin-chang's age is twenty-seven, and that of her husband, Chang-lang, thirty. I once had a brother named Lew-Tsung-taou, whose only son was in his infancy called Yin-sun. [*He sighs.*] This child has a most unhappy destiny! My brother died very early and left a widow. As she and my wife could not agree together, my sister-in-law wished with her son to spend the days of mourning in her own family. Thus she might, in the first place, depend on her parents for support; and secondly, by the labour of her hands procure something towards her son's education. Soon afterwards this sister-in-law suddenly died, and left her son destitute. His relations upon this said to him, "What are you doing here, child? Have you not an uncle at Tung-ping-foo, well-known to every one? Why do you not go to him?" They gave the youth some money for the journey. He came to to Tung-ping-foo to seek me, bringing his mother's bones with him; and I had them deposited with those of my brother. This young man is now twenty-five—Alas! that wife of mine still remembers her quarrel with his mother; for on every slight occasion she abuses him; and frequently causes him to be beaten. She cannot bear even the sight of my nephew!

During Lord Macartney's embassy, among the diversions given in honour of the Emperor's birthday at the court of Ge-hol, in Mant-choo, Tartary, was a Chinese comedy, to which the ambassador was invited. The comedy began at eight o'clock, and lasted till noon. The emperor was seated on a throne opposite the stage, which projected a good deal into the pit. The boxes were on each side, without sides or divisions. The women were placed above, behind the lattices, so that they might enjoy the amusements of the theatre without being observed. The Emperor sent for the Ambassador and Sir George Staunton soon after they entered, and told them with great condescension of manner, that they ought not to be surprised to see a man of his age at the theatre, for that he seldom came there except upon a very particular occasion like the present; for that, considering the extent of his dominions, he could spare but little time for such amusements.

The theatrical entertainments, (says Lord Macartney,) consisted of great variety both tragical and comical; several distinct pieces were acted in succession, though without any apparent connexion with one another. Some of them were historical, and others of pure fancy, partly in *recitativo*, partly in singing, and partly in plain speaking, without any accompaniment of instrumental music, but abounding in battles, murders, and most of the usual incidents of the drama: last of all was the grand pantomime, which from the approbation it met with, is, I presume, considered as a first-rate effort of invention and ingenuity. It seemed to me, as far as I could comprehend it, to represent the marriage of the Ocean and the Earth. The latter exhibited her various riches and productions, dragons, and elephants, and tigers, and eagles, and ostriches, oaks and pines, and other trees of different kinds. The Ocean was not behindhand, but poured forth on the stage the wealth of his dominions, under the figure of whales and dolphins, porpoises and leviathans, and other sea monsters, besides ships, rocks, shells, sponges and corals, all performed by concealed actors, who were quite perfect in their parts, and performed their characters to admiration. These two marine and land regiments, after separately parading in a circular procession for a considerable time, at last joined together, and forming one body came to the front of the stage, when after a few evolutions they opened to the right and left to give room for the whale, who seemed to be the commanding officer, to waddle forward; and who, taking his station exactly opposite to the emperor's box, spouted out of his mouth into the pit several tons of water, which quickly disappeared through the perforations of the floor. This ejaculation was received with the highest applause, and two or three of the great men at my elbow desired me to take particular notice of it; repeating at the same time, *Hao kung hao*,—'charming, delightful.'

Sir J. Barrow suspects that the amusements of the theatre have in some degree degenerated at court since the time of the Tartar conquest. Dancing, riding, wrestling, and posture-making, are more congenial to the rude and unpolished Tartar, than the airs and dialogues of a regular drama, which is better suited to the genius and spirit of the ceremonious and effeminate Chinese.

I am led, (he says,) to this observation, from the very common custom among the Chinese officers of state of having private theatres in their houses, in which, instead of the juggling tricks above mentioned, they occasionally entertain their guests with regular dramatic performances.

In short, (observes the same writer,) the greater part of the amusements of the Chinese are at the present day of a nature so very puerile, or so gross and vulgar, that the tricks and the puppet-shows which are occasionally exhibited in a common fair of one of the country towns of England, may be considered as comparatively polished, interesting, and rational. In sleight-of-hand, in posture-making, rope-dancing, riding, and athletic exercises, they are much inferior to Europeans; but in the variety of their fireworks they perhaps may carry the palm against the whole world. In every other respect the amusements of the capital of China appear to be of a low and trifling nature, neither suited to the affected gravity of the government, nor to the generally supposed state of civilization among the people.

Of the fireworks exhibited at Gehol, Lord Macartney says, that in some particulars they exceeded any thing of the kind he had ever seen. In grandeur, magnificence, and variety, they were, he owns, inferior to the Chinese fireworks which he had seen at Batavia, but infinitely superior in point of novelty, neatness, and ingenuity of contrivance. One piece of machinery he greatly admired: a green chest of five feet square was hoisted up by a pulley to the height of fifty or sixty feet from the ground, the

bottom was so constructed as then suddenly to fall out, and make way for twenty or thirty strings of lanterns enclosed in the box to descend from it, unfolding themselves from one another by degrees, so as at last to form a collection of at least five hundred, each having a light of a beautifully coloured flame burning brightly within it.

This devolution and developement of lanterns, (which appeared to me to be composed of gauze and paper,) were several times repeated, and every time exhibited a difference of colour and figure. On each side was a correspondence of smaller boxes, which opened in like manner as the others, and let down an immense network of fire, with divisions and compartments of various forms and dimensions, round and square, hexagons, octagons, and lozenges, which shone like the brightest burnished copper, and flashed like prismatic lightning with every impulse of the wind. The diversity of colours, indeed, with which the Chinese have the secret of clothing fire, seems one of the chief merits of their pyrotechny. The whole concluded with a valcano or general explosion and discharge of suns and stars, squibs, bouncers, crackers, rockets, and grenadoes, which involved the gardens for above an hour after in a cloud of intolerable smoke.

RECREATIONS IN NATURAL PHILOSOPHY.

No. VI.

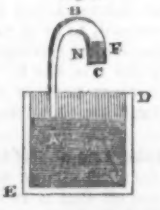
On Capillary Attraction (*concluded.*)

In our last article, we noticed several attempts to produce perpetual motion, made for the most part by men altogether unacquainted with the laws which regulate the phenomena of nature. It will not be uninteresting to notice a few plans proposed by distinguished scientific observers for effecting the same object. We will then conclude this article with a short account of some interesting phenomena connected with capillary attraction, not included in our former article.

The celebrated Bernouilli conjectured that the arrangement shown in fig. 1 would produce a perpetually flowing current. Within the bent part, F, of the siphon tube, is a filter of some kind: two liquids of different densities are mixed, and poured into the short end of the tube E, and the filter must be of such a nature as to allow one only of the liquids to pass through. Now, if the heights F E and F G, (or their equivalents C D and A B,) were inversely as the specific gravities, and the lighter of the two liquids passed through the filter, the long arm would become filled with the filtered light liquid, exactly when the short arm became filled with the heavier. But Bernouilli supposed that if F G were a little shorter than to answer the proportion just named, the liquid would reach G and begin to flow over before E was quite filled; and if allowed to flow back into E along the inclined channel, a perpetual current would be established. Such is Bernouilli's plan for a perpetual motion, but we are not aware that it has ever been put to the test.

Fig. 1.

Fig. 2.



Another scientific plan is shown in fig. 2. E D is the section of a vessel containing water. A B is a capillary tube of so small a bore, that the water will rise up within it to the bent part B. B C is a portion of the tube of larger bore, so that the end C being dipped in water the fluid would rise to F. It was therefore supposed that when the whole tube was filled with water, and the end A dipped into the reservoir, the part B F would be kept filled with water which had flowed over the bend from A, and thus overcoming the capillary attraction at C F, would cause a constant flow from A to C, and so down again into the reservoir. This plan, like the former, is merely speculative, and does not seem ever to have been carried into practice.

Connected with capillary attraction is the curious subject of *endosmose*, or the attraction of a thin fluid by a denser one, through an animal or vegetable membrane. M. Dutrochet found that on partly filling the air-bladder of a carp with thin mucilage, tying it securely at the neck, and placing it in water, that it gained weight by attracting water through its pores: this he called *endosmose*, from two Greek words signifying *a forcing in*. Having filled a similar bladder with water, he placed it in thin mucilage, and found that it lost weight, the water being attracted through the pores of the membrane into the surrounding mucilage: this phenomenon he named *exosmose*, from two Greek words implying *a forcing out*. The same eminent observer has contrived an instrument called an *Endosmometer*, for estimating the degrees of force with which these remarkable actions take place. This instrument is shown in fig. 3, where I is a tube of glass fitting tightly into a vessel K, which is closed at the bottom by a membrane V V, or some porous substance whose powers of endosmose it is wished to examine.

We will suppose V V to be a membrane tightly stretched over the edges of the reservoir K, and fastened securely, so that no liquid can enter at the bottom except by traversing the pores of the membrane. If alcohol be poured into K, and the reservoir be placed and supported in water, as shown in the figure, so that the membrane may not touch the vessel containing the water, mechanical equilibrium will soon be established between the liquid in K and that in N, and the tension of the bladder, so that the alcohol will settle at a certain level in the tube, which we will suppose to be at N′, N being the level of the water in the outer vessel. But we shall soon mark a considerable change: in about a quarter of an hour the alcohol will have ascended considerably above N′, and will continue to ascend; so much so, that if the tube I be not sufficiently long, the liquid will, in the course of twelve hours, flow over at the top of the tube. It will, in fact, have ascended more than twenty inches within that time. M. Dutrochet says that a mucilage formed of water thickened with sugar, in the proportion of one part sugar and two of water, was productive of a power of endosmose capable of sustaining a column of mercury of 127 inches.

Fig. 3.

The remarkable experiment that we have just detailed, cannot be attributed to ordinary capillary attraction, which would scarcely be capable of maintaining the alcohol half or three-quarters of an inch above the exterior level. The water passes through the membrane to the alcohol in opposition to the hydrostatic pressure upon it, which is considerable, and causes the membrane to bulge outwards. The theory of endosmose is at present obscure; its discoverer assigns electricity as the cause; and M. Poisson, in an ingenious theory, endeavours to esta-

blish a new description of capillary attraction; but it would be out of place here to discuss the merits of either theory

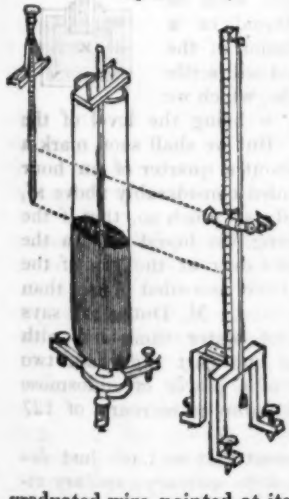
Although the facts of endosmose and exosmose are comparatively new to science, they have been practically known for a long time to a class of men which is unfortunately too numerous. The smugglers of spirits on the Continent enclose brandy in bladders, which they wear about their persons, concealed under their clothes. In this way bands of smugglers introduce brandy to places otherwise inaccessible to them: but they find that a skin full of the spirit, after having been worn about the person for several hours, has diminished in quantity but has wonderfully improved in quality. It is an old recipe, too, in pharmacy, for strengthening spirits of wine, to fill a bladder therewith and hang it up in a situation exposed to the air, for a week or two: water alone will pass out, and thus the spirit becomes stronger.

M. Dutrochet finds that in transmitting liquids through the tissue of plants, vegetables could be gorged therewith by placing them in water, and that they could be emptied again by placing them in a heavier liquid than that contained in them. He refers the motions of sap to endosmose; also the sleep of plants, and the directions taken by some of them when under the influence of certain agents, such as light, to the source of which most plants naturally turn.

The subject of capillary attraction is, undoubtedly, an important one, and it has, therefore, engaged the attention of many celebrated philosophers. In order to be better able to watch its phenomena, Gay Lussac contrived a complicated arrangement which we will briefly describe, merely to show the reader how much care is necessary to be bestowed by one who wishes to get accurate results in the investigation of this delicate subject.

Fig. 4 shows Gay Lussac's apparatus complete. A vessel containing the liquid is mounted upon a stand furnished with graduating screws, in order that the upper rim of the vessel may be made perfectly horizontal. The capillary tube is passed through a socket contained in a flat plate which rests upon the edge of the vessel: by this means the tube can be moved up and down. A few inches on one side of this vessel, is a graduated scale, mounted on a stand, furnished with adjusting screws and a plumb-line, in order that the scale may be made perfectly vertical. A small micrometer is attached to this scale, through which the level of the liquid in the capillary tube is observed. A graduated wire pointed at its lower end, and passing through a socket in a flat plate, is now placed in the vessel in such a manner that the point of the wire shall just touch the surface of the liquid as seen by the micrometer, which, sliding up and down on the scale, can be conveniently moved about. The liquid is now removed from the vessel in such a manner as not to disturb it in any way, and in such quantity that the column in the capillary tube shall descend, and its level exactly correspond with the point of the wire which was in contact with the surface of the liquid in the vessel. Thus, by observing the figure marked upon the scale at the first observation, and that obtained at the second when the pointed wire and the summit of the capillary column coincide, we get the precise length of such column above the liquid level included between the two figures marked upon the vertical scale.

Fig. 4.



OLD ENGLISH SUMPTUARY LAWS.

It is well known that in the reign of Elizabeth (and of her immediate successor, James I.), several sumptuary laws were enacted,—laws for limiting the expenses of dress. Elizabeth attached to regulations respecting articles of dress a degree of importance nearly equal to that of the monarchy itself. She issued numerous proclamations on the subject, and caused precepts to be sent to the companies, for the purpose of having her orders carried into effect. Thus, by her orders, in 1579, two members of the Ironmongers' company were chosen to attend, with two men free of the Grocers' at Bishopsgate, from seven o'clock in the morning till six in the afternoon. They were to examine the habits of all persons passing through the gate! But to do her majesty justice, she was not by any means so outrageous as his majesty King James, her successor. Some of his feats in putting down extravagance, are thus described:—"James exceeded Elizabeth in his love for these minutiæ. 'The abuse growing by excesse, and strange fashions of apparrell, used by manye apprentises, and by the inordinate pryde of mayde servauntes and woman servauntes, in their excesse of apparell and follye in varietie of newe fashions,' caused that decorous monarch such uneasiness, about the year 1611, that the mayor, by his orders, sent precepts to the wardens of companies, enjoining them to convene, and to harangue their several fraternities on this heinous sin. 'Mr. Warden Burrell,' on reading the precept to the Grocers' company, 'made sundrye godly and charitable exhortacions to each to see reformacion made in his owne familye, accordynge to the meaning of the same; and the common council afterwards embodied certain regulations into an act, in which every item of apparel to be worn, both by apprentices and maid-servants, with the kind of material composing it, or 'the stuffe, fashion, and goodnesse,' are detailed with the minuteness of a tailor or dressmaker. Apprentices were to wear 'no hat,' the facing whereof should exceed three inches in breadth in the head; or which, with the band and trimming, should cost above five shillings; the band was to be destitute of lace, made of linen, not exceeding five shillings the ell, and to have no work or ornament than a plain hem and one stitch. And if the apprentice should wear a ruff-band, it was not to exceed three inches in height before it was gathered and set into the stock, nor more than two inches in depth before the setting into the same stock. The collar of the doublet was to have neither 'poyet, well (whale) bone, or plaits,' but to be made close and comely, and, as well as the pantaloons, was to be made only of 'cloth, kersey, fustian, sackcloth, canvasse, English leather, or English stuffe,' and of not more than two shillings and sixpence the yard; his stockings were to be of woollen, yarn, or kersey, he was not to wear 'Spanish shoes with polonia heels;' or to have his hair with any 'tufte or lock, but cut short in decent and comely manner.' The London servant-girl was, if possibie, more restricted. She was to wear no 'lawn, kambrick, tiffany, velvet lawns, or white wires on the head,' or about 'the kerchief, koyfe, crest cloth, or shadow,' but only linen, and that not to exceed five shillings the ell. Her ruff was on no account, to be of more than four yards in length before the gathering, or settings in, or of greater depth than three inches; nor was she to 'wear any fardingal at all, great or little; nor any body or sleeves of wire, whalebone, or other stiffing(stiffening), saving canvasse or buckram only.'"

They take very unprofitable pains who endeavour to persuade men that they are obliged wholly to despise this world and all that is in it, even whilst they themselves live here: God hath not taken all that pains in forming, and framing, and furnishing, and adorning this world, that they who were made by Him to live in it should despise it; it will be well enough if they do not love it so immoderately, to prefer it before Him who made it.—Clarendon.

PHILOSOPHY OF THE HOUR-GLASS.

In olden time, long ere the art of clock-making was discovered, our ancestors marked the fleeting hours by the flowing of sand in a glass. This contrivance was called the hour-glass, and it is still very generally to be found upon the table of the public lecturer, or the private teacher, in the laboratory of the philosopher, or in the cottage of the peasant. It is a far more accurate measurer of time than is usually imagined; and, therefore, perhaps a short account of the theory of its action may be acceptable.

The investigation was undertaken a few years since by M. H. Bournand: his experiments are exceedingly curious, and merit to be more generally known. A few only of the most remarkable, and easy of performance, are detailed in the following notice.

The first remarkable fact regarding the hour-glass is, that the flow of its enclosed sand is perfectly equable, whatever may be the quantity contained in the glass, at any period of its flowing: or, in other words, that it runs no faster when the upper cone is quite full, than when it is nearly empty. This is contrary to what we might expect, for it would be natural enough to conclude, that when full of sand, the lowest particles would sustain a greater pressure from the incumbent mass, and therefore, be more swiftly urged through the aperture, than when only a quarter full, and near the close of the hour. The fact that the flow is equable, at any period, may be proved by a very simple experiment.

Provide a quantity of what is called *silver-sand*, (well known for domestic use), dry it upon a hot stove-plate, or in an iron ladle over the fire; then sift it through a tolerably fine sieve, carefully removing all lumps of clay or stone, which are frequently found in it. Next, take a tube of any material, length, or diameter, closed at one extremity, and in the bottom make a small aperture, say the eighth of an inch, place the finger over this, or stop it lightly with a small plug, and then fill up the tube with the sifted sand.

Hold the tube *steadily*, or affix it to a wall or a frame, at any convenient height from a table, and then removing the finger or plug, permit the sand to flow in any measure, for any given time—suppose into a common graduated glass measure—for a quarter of a minute. A certain quantity is thus obtained, which must be noted. Now let the tube be only a half or a quarter full of sand, and begin to measure again, for a like time, the same quantity of sand will flow; and even if by means of a ruler or plug, the sand in the tube is violently pressed upon, the flow of the sand from the aperture, will not, in the least degree, be accelerated, provided the tube is kept steady, and the experimental comparisons all accurately and fairly made. Now all this admits of a simple and satisfactory explanation. Sand, if allowed to fall quietly upon any surface, will form itself in a conical heap, having an angle of about 30°. This is seen in the lower cone of the hour-glass, or can be shown by letting the sand fall from the aperture of the tube just mentioned. Whenever a load of dry sand is thrown from a cart or barrow, or sifted through a screen by the builder in making mortar, it forms a like conical heap, having an angle of 30° or 35°. Now then observe the application of this fact of every-day occurrence; it will show how intimately "things familiar" are connected with practical science.

As sand thus falls at a determinate angle, it is easy to imagine that, when poured into the tube, it must fill it with a succession of conical heaps, and that all the *weight* which the bottom of the tube sustains, is only that of the heap which *first* falls upon it, and that the succeeding heaps are thus prevented from exerting any *perpendicular* pressure upon the bottom, but that they also exert a *lateral* pressure against the walls of the tube.

When pressure is applied to the top of the sand, it is only transmitted *laterally*, and that to a very little extent; consequently the lowest heap of sand enjoys its flow, uninfluenced by the strata or pressure above it. This is the reason why the sand in the hour-glass flows with such regularity; and that any given base sustains no weight of sand, but that of the first heap which falls upon it, and is in immediate contact with it, may be proved by taking a tube, about an inch diameter, open at both ends, wetting with the lips the edges of a small piece of tissue-paper, and applying this to one end of the tube, so as to form a bottom, held on by a very slight adhesion. Fill this tube carefully with any weight of sand, and the paper will not be forced away, not even if with a round ruler or rod, great pressure is applied to the top surface of the sand. All the weight of sand that the tissue-paper supports is the little heap which first falls upon it.

If the experiment is made upon a larger scale, with tubes three or four inches in diameter, and five or six feet long, it is better to paste the paper round the bottom, because the first heap, in such case, would be of considerable weight; but if the paper is strong enough to resist *it*, forty or fifty pounds of sand may be poured into the tube, and all lifted from the ground together, without the slightest fear of the paper being forced away.

The experiment admits of another modification. Take the tube open at both ends, and place one of them in contact with the bottom of a small cup, floating upon water, then fill up the tube with sand; none of it will run out into the cup: and that there is no perpendicular pressure is evident from the cup still continuing to float. It sustains no weight, save that of the first heap; the hand of the operator sustains the weight of all the rest of the sand. Draw away the tube, the sand then rushes into the cup, in obedience to the law of gravitation, and its weight causes the cup to sink.

From such experiments it may be concluded that it must be extremely difficult to *thrust* sand out of a tube, by means of a fitting plug or piston; and this, upon trial, is found to be the case. Fit a piston to a tube, (exactly like a schoolboy's pop-gun), pour some sand in, and try with the utmost strength of arm to push out the sand. It will be found impossible to effect this: rather than the sand should be propelled, the tube will burst *laterally*.

Directions are often given by naturalists for shooting birds with a charge of fine sand, so that their plumage may not suffer the damage which is usually occasioned by an ordinary charge of small shot. This proceeding ought to be made with considerable caution, for it must be evident, from the last experiment, that a charge of sand would resist the expansive force of gunpowder, and violently strain the barrel, perhaps burst it; to say nothing of goring and spoiling its polished interior by the rapid friction of the sand; and supposing it in very small quantity, and successfully propelled, it is certainly rather a hazardous experiment. To prove how a small column of sand will resist the expansive force of a large charge of gunpowder, it will be sufficient to instance the method adopted by engineers for blasting rocks.

A hole is drilled in the rock, of the requisite depth, at the bottom of which the charge of powder is placed: a long match, or reed, filled with powder, is then put down, and around this sand is merely poured in, so

as to fill the hole: a train is laid and fired, and presently the explosion takes place, rending away the mass of rock. The loose column of sand is not *blown out* of the hole, leaving the rock unshaken, but it keeps its place, until it compels the solid rock to yield unto its singular power.

The discoverer of these facts, relating to the flow of sand in the hour-glass, makes the following observations:

"There is perhaps no other natural force on the earth which produces by itself a perfectly uniform movement, and which is not altered either by gravitation, or the friction, or resistance of the air: for the height has no influence; *friction*, in place of being an obstacle, is the *regulating* cause; and the resistance of the air within the column must be so feeble as to be altogether insensible as a disturbing force."

[*Magazine of Popular Science.*]

BODY AND SOUL.

The free and active spirit, by which we think and act, hath properties which have induced the reasoners of every age and country, to allow it to be immortal. On looking into ourselves, on finding conscience, memory, and thought, in all its various modes, and wonderful methods of manifestation, working their several tasks independent of everything without, we derive from the very constitution of our being, from our own simple individual consciousness, a proof which not the sophistry of hell itself can gainsay, that our souls shall defy the power of time, and never be holden by the grave, or fall under the hand of death. The life of the soul is an essential life. Its motions are demonstrations of life, and its activity never ceases. No figure, no image of mortality applies to the soul. Though darkness may come over it, it diminishes not its energies; and though time may change its habits of willing or deciding, it makes no change in its state or constitution.

But vast is the difference when we look at the body; weak, corruptible, and decaying, destitute of power, except that which is given it; motionless, till the mind gives it motion; unconscious, till the mind gives it consciousness; it partakes in all its habits and principles of the dull, gross matter, which forms the bulk of the unconscious earth. Time wears it like a blighting wind, disease twists and tortures its internal machinery, till the fabric falls to ruin: a little wrong mingling of its fluids, a momentary pause in the pulses of its organs, reduces it to a state of torpor. Then comes death, and in a few days, the brightest, the loveliest of forms, the countenance that won all hearts by its sweetness, the graceful, firm-set limb, that the sculptor and the painter would employ their best skill to imitate, are covered with the heavy dews of corruption. The hours have to be numbered, how long the wreck of humanity may be looked at by the human eye; and these hours are few. Decay hastens its work darkly and fearfully. The nerves of the strongest shrink at beholding its progress, and the frame broken up and marred, is hurried into the grave. There the forces of the earth operate around it; limb is let loose from limb; the eye falls from its socket; the shrivelled, or dissolving mass, becomes broken into clods, and in a little time the clod drops into formless dust. And taking a handful of that dust, and flinging it up into the air, we shall see that the wind will scatter it like the common dust of the highway; and then human reason may well ask, Is this the body of a man? And how shall the bodies of men arise? Let us consider the question; first, by the light of reason, and then, by that of the Gospel.

[Stebbing's *Discourse on Death.*]

DIALOGUE BETWEEN THE BODY AND SPIRIT.

Body.—Spirit! I feel that thou
Wilt soon depart.
This body is too weak longer to hold
The *immortal* part.
The ties of earth are loosening—
They will break;
And thou—even as a joyous bird,
Thy flight will take
To the eternal world.
Say, Spirit! say!
Wilt thou return again? once more illume
My house of clay?
Or must this body, which has been to thee
A temple and a dwelling-place,
Perish for ever, and forgotten be?
Spirit.—Yes! I must leave thee.
I am longing
For the communion of those blessed ones
Within the courts of heaven,
Who tune their golden harps
To the eternal praise of Him, who gives
That home above—
Which *they* have gained, and which I would attain,
Through Him who came to prove
That *God is Love*:
And by him too, I know that *thou*,
My earthly tenement,
Within the dust must lie,
And there turn to corruption,
Even as the seed doth die
To be revived again.
Death hath no power o'er the *soul*,
For Christ hath conquered—
The grave cannot retain its victims
When *He* cries—Come forth!
Then I return to *thee*—
The victory is gained—
For "*Christ hath made us free.*"—?

Women are formed for attachment. Their gratitude is unimpeachable. Their love is an unceasing fountain of delight to the man who has once attained it, and knows how to deserve it. But that very keenness of sensibility which, if well cultivated, would prove the source of your highest enjoyment, may grow to bitterness and wormwood if you fail to attend to it or abuse it.—Hogg.

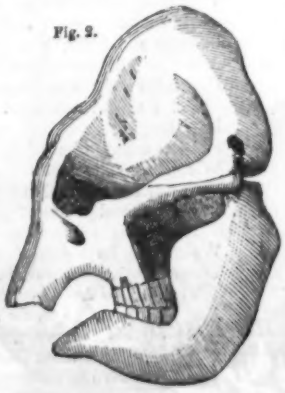
Take care thou be not made a fool by flatterers, for even the wisest men are abused by these. Know therefore, that flatterers are the worst kind of traitors; for they will strengthen thy imperfections, encourage thee in all evils, correct thee in nothing, but so shadow and paint all thy vices and follies, as thou shalt never, by their will, discern evil from good, or vice from virtue: and because all men are apt to flatter themselves, to entertain the additions of other men's praises, is most perilous. Do not therefore praise thyself, except thou wilt be counted a vain-glorious fool, neither take delight in the praise of other men, except thou deserve it, and receive it from such as are worthy and honest, and will withal warn thee of thy faults; for flatterers have never any virtue, they are ever base, creeping, cowardly persons. A flatterer is said to be a beast that biteth smiling; it is said by Isaiah in this manner: *My people, they that praise thee, seduce thee, and disorder the paths of thy feet:* and David desired God to cut out the tongue of a flatterer. But it is hard to know them from friends, they are so obsequious and full of protestations; for as a wolf resembles a dog, so doth a flatterer a friend. A flatterer is compared to an ape, who because she cannot defend the house like a dog, labour as an ox, or bear burdens as a horse, doth therefore yet play tricks, and provoke laughter. Thou mayest be sure that he that will in private tell thee thy faults, is thy friend, for he adventures thy dislike, and doth hazard thy hatred; for there are few men that can endure it, every man for the most part delighting in self-praise, which is one of the most universal follies that bewitcheth mankind.—Sir Walter Ralegh.

VARIOUS SPECIES OF THE ELEPHANT.

THERE is a greater difference than is generally supposed in the conformation of the two living species of Elephants, namely, the African and the Asiatic; and the fossil Elephant or Mammoth, in like manner, differs from both the others. The engravings represent the sculls of the three species. Fig. 1 is the head of the Mammoth; it is much more pointed on the summit than that of either of the other species; its trunk also must have been much larger, if we may judge from the size and prominence of the bony support to which it has been attached; there is also a great difference in the formation of the teeth, and the hide was thickly covered with coarse hair.

Fig. 1.

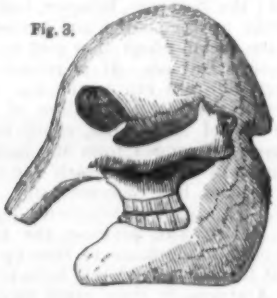
Fig. 2.



The head of the Indian Elephant, fig. 2, resembles the last species much more than the African in its great elevation, but it is distinguished by being more rounded at the summit; the bone which supports the trunk is also less prominent. The ears in this species are much smaller than those of the African Elephant, and the tusks do not grow to so great a size. In the female they are seldom to be seen without turning the lip on one side, and on this account it is generally believed that the female is unprovided with tusks.

The head of the African Elephant, fig. 3, is very different from the others, being much shorter and

Fig. 3.



rounder; the ears are extremely large and hang down the shoulders; it is much smaller than the last, and both sexes are furnished with very large tusks.

The native country of the Mammoth, and the cause of the destruction of its race, is a problem which, perhaps, will never be solved, but the remains of this stupendous creature have been found in almost every part of the northern hemisphere of the globe, in Europe, Asia, and America. When the enormous bones of this animal were first discovered, people were so little acquainted with comparative anatomy, that they were supposed to be the bones of giants; and designing men, taking advantage of this belief, exhibited collections of them for money. In 1613, some of these bones were found near the Chateau of Chaumont, in France, and a medical man named Mazurier, exhibited those which were perfect, at Paris and other places: to make the story more wonderful, his exhibition was accompanied by a little pamphlet, in which it was stated that they had been found in a tomb thirty feet in length, over which was the inscription (*Teutobochus Rex,*) the name of a king of the Cimbri, who fought against the Roman Marius.

The Indian Elephant is found on both sides of the Ganges, in the southern part of China, Java, Borneo, Sumatra, and all the larger East Indian islands; it has never been found in Africa, is larger than the African species, and appears to be much more readily tamed.

The African species is found in a great portion of that continent from the coast of Guinea to the Cape of Good Hope, but few attempts seem to have been made to force it to submit to the will of man, and it is chiefly sought after on account of the value of its ivory.

INDIAN TRADITION OF THE GREAT BUFFALO.

THE following tradition of the American Indians, concerning the Great Buffalo, or Mammoth, of ancient days, is given by Mr. Peale, in his account of the fossil remains of the Mammoth found in North America, in 1801. As Mr. Peale remarks, "the language of this tradition is certainly English, and, perhaps, a little too highly dressed, but the ideas are truly Indian."

Ten thousand moons ago, when nought but gloomy forests covered this land of the sleeping sun; long before the pale men, with thunder and fire at their command, rushed on the wings of the wind to ruin this garden of nature; when nought but the untamed wanderers of the woods, and men as unrestrained as they, were the lords of the soil; a race of animals existed, huge as the frowning precipice, cruel as the bloody panther, swift as the descending eagle, and terrible as the angel of night. The pines crashed beneath their feet, and the lake shrunk when they slaked their thirst; the forceful javelin in vain was hurled, and the barbed arrow fell harmless from their side. Forests were laid waste at a meal; the groans of expiring animals were every where heard, and whole villages, inhabited by men, were destroyed in a moment.

The cry of universal distress at length extended even to the region of peace in the west, and the good Spirit interposed to save the unhappy. The forked lightning gleamed around, and loudest thunder rocked the globe! The bolts of heaven were hurled upon the cruel destroyers alone, and the mountains echoed with the bellowings of death.

All were killed except one male, the fiercest of the race, and him, even the artillery of the skies assailed in vain. He ascended the bluest summit which shades the source of the Monangahela, and, roaring aloud, bid defiance to every vengeance. The red lightning scorched the lofty firs, and rived the knotty oaks, but only glanced upon the enraged monster. At length, maddened with fury, he leaped over the waves of the west at a bound, and this moment reigns the uncontrolled monarch of the wilderness.

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